

## Epithelial Thinning in Limbal Stem Cell Deficiency.

**Journal:** Am J Ophthalmol

**Publication Year:** 2015

**Authors:** Eric H Chan, Luxia Chen, Fei Yu, Sophie X Deng

**PubMed link:** 26163009

**Funding Grants:** Regeneration of Functional Human Corneal Epithelial Progenitor Cells, Regeneration of Functional Human Corneal Epithelial Progenitor Cells, Regeneration of a Normal Corneal Surface by Limbal Stem Cell Therapy

### Public Summary:

**PURPOSE:** To investigate the epithelial thickness in the cornea and limbus in limbal stem cell deficiency (LSCD) by using in vivo laser scanning confocal microscopy. **DESIGN:** Cross-sectional comparative study. **METHODS:** Confocal images of 48 eyes of 35 patients with LSCD collected by the Heidelberg Retina Tomograph III Rostock Corneal Module Confocal Microscope from 2010 to 2014 were analyzed. Volume Z-scans of the central cornea and the superior, nasal, inferior, and temporal limbus were included in the analysis. Eleven normal eyes served as control. Epithelial thickness in all locations was measured by 2 independent observers. **RESULTS:** The mean epithelial layer thickness was 48.6 +/- 2.3  $\mu$ m in the central cornea and 63.7 +/- 11.3  $\mu$ m in the limbus in the control. Compared with the epithelial thickness in normal control, the epithelial thickness in LSCD patients was reduced by an average of 20.2% in the central cornea and 38.5% in the limbus (all  $P < .05$ ). The mean corneal epithelial thickness in patients with LSCD reduced 7.6%, 20.8%, and 61.3% in the early, intermediate, and late stage, respectively, compared to the control. In the limbus, the overall epithelial thickness decreased 30.0%, 39.7%, and 62.8% in the early, intermediate, and late stage of LSCD, respectively (all  $P < .05$ ). Epithelial thinning correlated with the severity of LSCD in both cornea and limbus. In eyes with sectoral LSCD, a similar degree of epithelial thinning was also detected in the clinically unaffected limbal regions. **CONCLUSIONS:** Both corneal and limbal epithelia become progressively thinner in LSCD. Epithelial thickness could be used as a diagnostic measure of LSCD.

### Scientific Abstract:

**PURPOSE:** To investigate the epithelial thickness in the cornea and limbus in limbal stem cell deficiency (LSCD) by using in vivo laser scanning confocal microscopy. **DESIGN:** Cross-sectional comparative study. **METHODS:** Confocal images of 48 eyes of 35 patients with LSCD collected by the Heidelberg Retina Tomograph III Rostock Corneal Module Confocal Microscope from 2010 to 2014 were analyzed. Volume Z-scans of the central cornea and the superior, nasal, inferior, and temporal limbus were included in the analysis. Eleven normal eyes served as control. Epithelial thickness in all locations was measured by 2 independent observers. **RESULTS:** The mean epithelial layer thickness was 48.6 +/- 2.3  $\mu$ m in the central cornea and 63.7 +/- 11.3  $\mu$ m in the limbus in the control. Compared with the epithelial thickness in normal control, the epithelial thickness in LSCD patients was reduced by an average of 20.2% in the central cornea and 38.5% in the limbus (all  $P < .05$ ). The mean corneal epithelial thickness in patients with LSCD reduced 7.6%, 20.8%, and 61.3% in the early, intermediate, and late stage, respectively, compared to the control. In the limbus, the overall epithelial thickness decreased 30.0%, 39.7%, and 62.8% in the early, intermediate, and late stage of LSCD, respectively (all  $P < .05$ ). Epithelial thinning correlated with the severity of LSCD in both cornea and limbus. In eyes with sectoral LSCD, a similar degree of epithelial thinning was also detected in the clinically unaffected limbal regions. **CONCLUSIONS:** Both corneal and limbal epithelia become progressively thinner in LSCD. Epithelial thickness could be used as a diagnostic measure of LSCD.

**Source URL:** <https://www.cirm.ca.gov/about-cirm/publications/epithelial-thinning-limbal-stem-cell-deficiency>